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# Water Pollution Survey
# Township of Sandwich South
# 1972

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**1972**

Report on a water pollution
survey of the township of
Sandwich South, county of
Essex : April, May, August, 1972.

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# REPORT ON A WATER POLLUTION SURVEY
# OF THE
# TOWNSHIP OF SANDWICH SOUTH

COUNTY OF ESSEX

April, May, August, 1972

DISTRICT ENGINEERS SECTION
SANITARY ENGINEERING BRANCH
DIVISION OF WATER SUPPLY AND POLLUTION CONTROL

17802

# TABLE OF CONTENTS

PAGE

GENERAL 1

SERVICES 2

SURVEY PROCEDURES AND PRESENTATION OF REPORT 4

WEATHER 6

DISCUSSION OF SURVEY
    Existing Conditions 7
    Recommendations 9

RESIDENTIAL DEVELOPMENT 12

SUMMARY AND RECOMMENDATIONS 14

KEY PLAN

APPENDIX I: Significance of Laboratory Results, Abbreviations and Symbols

APPENDIX II: Survey Results

APPENDIX III: Pictorial Survey

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## GENERAL

The Township of Sandwich South is located in the north-west sector of Essex County adjacent to the City of Windsor, Town of Tecumseh and the Village of St. Clair Beach (see Key Map).

Since 1966, the year when part of the former Township of Sandwich East was annexed, the Township population has been steadily rising from 3,764 in 1966 to 4,641 in 1972 which represents an annual growth rate of approximately 3.6% as compared to the overall growth rate of Essex County of 1.9%.

Residential and commercial development has mainly occurred in three locations of the Township. These are:

- the area south of Tecumseh
- the Maidstone area
- the Oldcastle area.

The development south of Tecumseh is predominantly residential in character and is located mainly to the west of Lesperance Road between Highway #2 and County Road #42. Since 1966, this area has been administered by the Township of Sandwich South. Prior to that it formed part of the former Township of Sandwich East which ceased to exist due to the annexation of most of its territory by Windsor. There are presently approximately 350 homes located here. A small section along County Road 42 to the west of Lesperance Road has been zoned industrial in the Official Plan of the Township. However, little industrial development has taken place to date.

The Hamlet of Maidstone is located in the south-east part of the Township and consists of strip development along Highway #3 and Malden Road. A post office and the St. Mary's School with an enrolment of about 300 pupils are located here.

Oldcastle is the Hamlet in the vicinity of the intersection of Walker Road and Highway #3. Some commercial and residential strip development along Highway #3 and Walker Road are the main characteristics of this area. Two industrial parks are developed here along North Talbot Road. The Town Hall is also located in this area. The Windsor Airport is approximately two miles north of Oldcastle at which point another concentration of homes has taken place along Base Line Road, Ray Road and Joy Road (see Key Map).

## SERVICES

A water distribution system consisting of 6-inch water mains, serves most of the existing streets in the predominantly residential area south of Tecumseh. The water is obtained from the Windsor-Tecumseh joint water works.

A water distribution system consisting of 8-inch and 6-inch water mains serves the area along Walker Road and North Talbot Road which has been designated for industrial development. The water is obtained from the Windsor Utilities Commission. Service connections to industries have been limited to 3/4" connections to restrict water usage in view of the soil conditions which are generally unsuitable for private sewage disposal systems.

A water distribution system extension from the Union Water System has recently been proposed to service the Hamlet of Maidstone.

Private wells are the main source of water in the other parts of the Township. Hydrogen sulphide is often present in water obtained from wells. This is quite common in Essex County.

Sewage disposal is by means of septic tanks throughout the Township. Virtually all these systems are equipped with an overflow drain to a storm sewer or roadside ditch. Since the soil conditions are unfavourable for the proper operation of septic tanks (heavy clay and/or high water table), many of these systems have failed and the result is the discharge of partly treated domestic wastes from the overflow drains of the septic tank systems to roadside ditches or storm sewers which in turn discharge into municipal drains.

A report under Section 51 (1) of the Ontario Water Resources Act was issued to the municipality on November 27, 1972 concerning the unsatisfactory method of private sewage disposal in the area south of Tecumseh. Local collector sewers and a trunk sewer are deemed necessary and should be provided in such a manner that they can be connected to the trunk sanitary sewer along Lesperance Road in the Town of Tecumseh in order to permit the transmission of sewage to the Little River sewage treatment plant for treatment and disposal. The necessary works are presently under design and the trunk sewers in Tecumseh and Windsor are presently under construction and have been oversized to accommodate the existing and future development of this part of the Township.

## SURVEY PROCEDURES AND PRESENTATION OF RESULTS

A water pollution survey was performed under dry weather conditions on April 11, April 14, May 9 and August 15, 1972 by staff of the District Engineers Section. During the survey, the sizes of outfalls were measured where possible for future reference. Other field observations such as the odour of sewage or the occurrence of black deposits at the foot of outfalls were noted. Black deposits are common where untreated or partially treated domestic wastes are discharged to watercourses.

The water depth in the storm sewer at the discharge point was measured and the volume of flow was estimated where possible.

Grab samples were taken at several storm sewer outfalls at points where they discharged into the watercourses. In addition, samples were taken at several locations on municipal drains. The samples were analyzed for common water pollution indicators, namely, biological oxygen demand ($BOD_5$), suspended solids, kjeldahl nitrogen, total phosphorus, fecal and total coliform counts per 100 ml.

The field observations for all stations, the chemical analyses and bacteriological examination results for those stations actually sampled, have been summarized and are provided in Appendix II of this report.

For the purpose of this survey, the Township has been divided into five drainage areas as listed below.

- Little River Drainage Area
- Pike Creek Drainage Area
- Manning Drain Drainage Area

- River Canard Drainage Area
- Turkey Creek Drainage Area

All observations and sampling points of drains and storm sewers ultimately draining to Little River have been given the prefix of LR. Similarly, other prefixes have been used for Manning Drain (MD), River Canard (RC), Turkey Creek (TC) and Pike Creek (PC).

At various locations photographs have been taken to illustrate the effects and the magnitude of the domestic wastes discharged to municipal drains and watercourses. The photographs are contained in Appendix III.

## WEATHER

The pollution survey was conducted during dry weather. Rainfall data from the Windsor Airport weather station for the months of April, May and August 1972 are presented below. This information was made available by the Atmospheric Environmental Services, Climatology Division, Environment Canada.

| April 1972 | | May 1972 | | August 1972 | |
|---|---|---|---|---|---|
| Date | Precip. in Inches | Date | Precip. in Inches | Date | Precip.in Inches |
| 2 | .01 | 1 | .59 | 1 | .04 |
| 3 | .37 | 4 | trace | 2 | .14 |
| 4 | .10 | 6 | .18 | 3 | trace |
| 6 | .04 | 7 | .31 | 6 | .17 |
| 12 | .04 | 8 | .32 | 7 | .37 |
| 13 | .05 | 13 | .11 | 8 | .40 |
| 14 | .01 | 14 | .20 | 9 | trace |
| 15 | 1.21 | 15 | trace | 11 | .01 |
| 16 | 1.23 | 16 | .08 | 14 | .86 |
| 19 | .60 | 29 | trace | 15 | trace |
| 20 | .13 | 30 | .35 | 16 | 1.05 |
| 21 | .12 | 31 | .02 | 17 | .25 |
| 22 | .30 | | | 18 | trace |
| 30 | .05 | | | 19 | .41 |
| | | | | 22 | .45 |
| | | | | 23 | .02 |
| | | | | 26 | .82 |
| | | | | 27 | .06 |
| Total | 4.26 | Total | 2.16 | Total | 5.05 |

From perusal of the rainfall data, it was concluded that much of the flow in the storm sewers and to a lesser extent also in the municipal drains could be attributed to the discharge of partially treated domestic wastes reaching the storm sewers and drains via the overflow from septic tank systems.

## DISCUSSION OF SURVEY

### Existing Conditions

In general, the results of the water pollution survey indicate the presence of pollutants in most of the drains. The chemical and bacteriological examination results leave no doubt as to the source of these wastes. The presence of fecal coliforms, high phosphate levels, $BOD_5$ and low suspended solids clearly indicate that inadequately treated domestic wastes from malfunctioning septic tank systems are gaining access to storm sewers and drains (see for example, Sampling Point LR-13, LR-14, PC-12, PC-15 and MD-3, Appendix II, and photographs #1, 3 and 4, Appendix III). Apparently, these septic tank systems have an extremely high failure rate because of poor soil conditions (heavy clay and/or a high water table) but much of the problem relates directly to the discharge of partially treated domestic wastes from the overflow with which many of the septic tank systems have been equipped.

The test results from a sample obtained from such an overflow from a tile bed system in the Oldcastle area (LR-1) revealed a fecal coliform count of 700,000 fecal coliforms per 100 ml, thereby clearly illustrating the unsatisfactory operation of such overflow systems. Based on the above observations, it is recommended that further septic tank systems using this type of device should be discouraged.

In particular, the results of the water pollution survey reveal that the magnitude of pollution in a drain is closely related to the degree of development which has taken place along that drain. In other words, where no development has taken place there was no evidence of pollution (see Sampling Points MD-2 and LR-19); where "concentrated" development on septic tank systems had occurred, there was ample evidence of pollution mostly in the form of objectionable black deposits and the presence of fecal coliforms. The validity of these observations is confirmed by comparison of the observation and test results of samples which are tabulated below obtained from two drains which both discharge to the Baillargeon Drain located in the north-east part of the Township, east of Lesperance Road (see Map). One of these drains (MD-2) has no development on it, whereas the other (MD-1) serves a substantially built-up area. A comparison of the two conditions is shown below.

| Date | April 11, 1972 | April 11, 1972 |
|---|---|---|
| Sampling Point | MD-1 | MD-2 |
| Drainage System | Storm sewers | Roadside ditch |
| Type of Development | Residential | None |
| Observations | Black deposits | No deposits |
| | Murky | Clear |
| | Smell of sanitary sewage | No odours |
| Test Results | Fecal coliform count<br>19,000 per 100 ml | Fecal coliform count<br>less than 4 per 100 ml<br>(<4 per 100 ml) |

By reviewing all the test results, it can be concluded that most of the ditches and open drains show various degrees of pollution, thus indicating that a potential health hazard does exist in many parts of the surveyed area, but especially in areas where development is concentrated and where a greater possibility exists of people (particularly children) coming in contact with these polluted waters. An example of a grossly polluted ditch in a residential area is given in photographs 5 and 6 of Appendix III ($BOD_5$ - 65 ppm and fecal coliform count 100,000 per 100 ml).

It is further noted that in addition to the already mentioned pollution problems which are caused by malfunctioning septic tank systems, there are also other sources which have caused a deterioration of the water quality of surface waters in the Township of Sandwich South. In particular, discharges of oil such as the one noticed at Rusette Drain (see Photograph #2, Appendix III), but also water pollution caused by agricultural runoff with high polluting potential. During the fall of 1972, two cases of runoff from corn ensilage stock piles, which had seriously affected the quality of the receiving watercourses had been investigated by this Ministry and the farmers were advised to take remedial action by the provision of a tank or a pit lagoon in which runoff from the corn ensilage stock piles and also from the barnyard could be collected. The collected material could then be pumped out and sprayed on land at times when it could be disposed of in a satisfactory manner.

## Recommendations

As a preliminary step to rectify part of the problems outlined in the foregoing section, the municipality has requested the Ministry of the Environment to prepare a rate proposal for the provision of sanitary sewers in the area south of Tecumseh. The sanitary collection system will become an extension of the sewer system now under construction in the municipalities of Tecumseh and St. Clair Beach. Treatment of the collected wastes will be at the Little River sewage treatment plant which is owned and operated by the City of Windsor.

The area south of Tecumseh seems at present the only area where a sewer system can be economically provided at this time. There are however two areas, ie., the Hamlet of Maidstone and the Oldcastle area where sanitary collection systems might be required in the future especially if further residential development in these hamlets should take place.

The Oldcastle area could in the future be serviced by an extension of the Lennon trunk sanitary sewer located in the south Windsor area, if an allowance for flows from this area would have been made in the design of the trunk sewers. It therefore may be advantageous for the municipality to discuss this with the City of Windsor in order that this area be included in the area to be serviced by the Lennon trunk sanitary sewer in the future. It would appear that sooner or later a sanitary collection system for this area will become necessary.

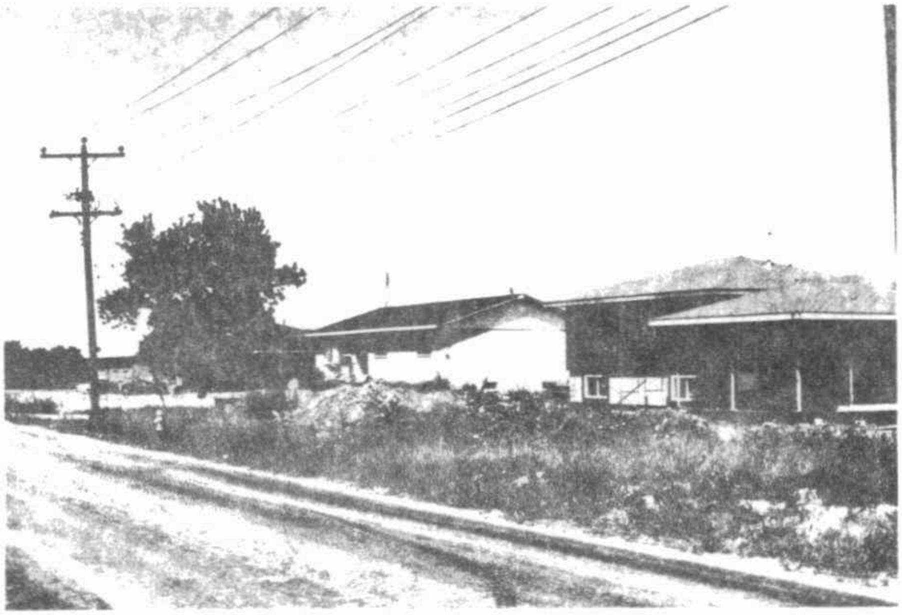
Any industry, considering locating in the Township, should be directed to areas where sanitary sewers are available since soil conditions preclude in most cases, the efficient use of septic tank systems and the only other alternative would appear holding tanks with haulage of the wastes to one of the Windsor sewage treatment plants.

The Maidstone area is isolated in regards to neighboring communities with communal services and pertaining to the availability of watercourses to receive effluent from a sewage treatment plant. It would appear therefore that the provision of a sewage collection and treatment works for the Hamlet of Maidstone would be extremely costly and the municipality should therefore carefully review its planning in this area. In light of the above mentioned situation, it is probable that construction of further commercial and residential development should be discouraged and be directed to areas where such services could be provided at a more economical cost.

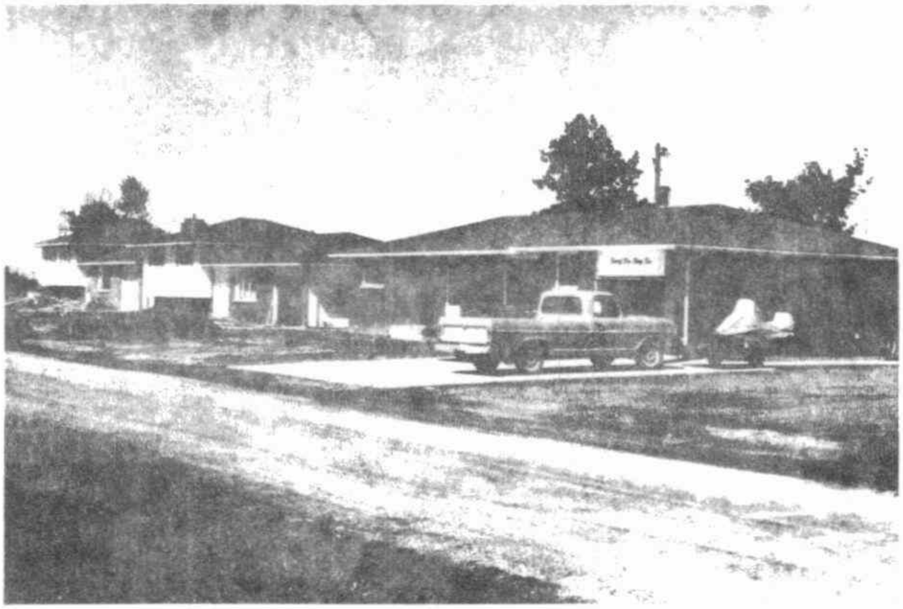
Since the pollution problems as recorded in this survey were widespread, their correction by means of a communal system does not appear to be economically feasible in many areas owing to the scattered and ribbon nature of the development. Therefore, correction would have to be carried out in many areas on an individual basis. The pollution problems are probably caused by malfunctioning or inadequately sized septic tank and tile bed systems or in some cases by septic tanks with no tile beds whatsoever. The municipality should initiate an investigation and correction program for these systems as soon as possible in order that the pollution problems caused by these failing systems can be eliminated or at least minized. The Private Waste and Water Management Branch of the Ministry of the Environment, in co-operation with the Metro Windsor-Essex County Health Unit, could be requested by the municipality to undertake a study to determine the number of failing septic tanks and to recommend alternative methods of correction to prevent pollution from domestic wastes.

## TOWNSHIP OF SANDWICH SOUTH

## EXAMPLES OF RECENT DEVELOPMENT UTILIZING SEPTIC TANKS SYSTEMS



Four homes under construction: (August 1972)
Location: East side Lesperance Road just south
of Baillargeon Drain



Three homes under construction (August 1972)
Location: East side of St. Alphonse Street

## RESIDENTIAL DEVELOPMENT

From the previous section of the report, it is obvious that remedial action is necessary to rectify the unsatisfactory polluting conditions and to alleviate the continuation of a potential health hazard which are apparently caused by malfunctioning septic tank systems. Many homes are however still being constructed utilizing septic tank systems especially in the area south of Tecumseh. Two photographs (see opposite page) were taken as examples of recent development on septic tank systems. It is further noted that in 1972 there were reportedly 41 housing starts in the Township.

Although it is realized that the municipality endeavours to encourage "concentrated" residential development rather than strip development, which is good practice, it would appear that if the current trend continues, the existing pollution and public health hazard would be aggravated. In light of this fact and in light of the generally very poor soil conditions and high water table which has been demonstrated in this report to result in failure of septic tank systems, further development utilizing these systems should therefore be curtailed.

The municipality should review its planning carefully and direct development only to those areas where communal services (watermains and sanitary sewers) can be provided. A limiting factor for communal systems in the Township is that there are no watercourses within the Township suitable to accept the discharge from a sewage treatment plant. Therefore, the only outlet which appears to be available to the Township is by means of the Windsor Sewerage System. For this reason, development should be directed in such a manner as to make use of this outlet.

The only area in the Township which can take advantage of the Windsor Sewerage System at this time, is the one south of Tecumseh which is bounded by Highway #2, Lesperance Road, Shawnee Road and County Road #42. Another possible area in the future might be the Oldcastle area, providing suitable arrangements can be made with the City of Windsor for sewage disposal.

## SUMMARY AND RECOMMENDATIONS

A water pollution survey was conducted under dry weather conditions throughout the Township of Sandwich South. The results of the survey revealed that domestic wastes from malfunctioning septic tank systems were gaining access to storm sewers, roadside ditches and municipal drains in virtually every area of the Township where development had occurred. Therefore, it can be concluded that a potential health hazard situation did exist in many parts of the surveyed area.

It was observed that the magnitude of pollution in a drain was closely related to the degree of development which has taken place along it.

Owing to poor soil conditions, it is apparent that septic tank systems do not function properly and further residential development utilizing septic tank systems should therefore be strictly curtailed.

The municipality should review its planning carefully and direct development only to those areas where communal services can be provided. A limiting factor for communal systems is that there are no watercourses suitable to receive the effluent from sewage treatment plants. The only outlet available to the Township appears therefore to be the Windsor Sewerage System.

The only area which can make use of the Windsor system in the immediate future is the development located south of Tecumseh. A Provincial sewage project is in fact underway to provide sanitary sewers for the existing residential development.

The Oldcastle area could in the future be serviced by the Windsor system providing suitable arrangement with the City of Windsor can be made for sewage disposal. The municipality may therefore wish to discuss this with officials of the City.

It was noted that in addition to the pollution problems, caused by malfunctioning septic tank systems, water quality impairment of the surface waters in the Township of Sandwich South had occurred due to the discharge of oils and agricultural runoff with high polluting potential (eg. runoff from corn ensilage stock piles). Every effort should be made to curtail such occurrences in the future.

Since remedial action is necessary to alleviate the pollution problems described in this report, the following recommendations are hereby presented to the Council of the Township of Sandwich South for their consideration and action.

1. A sewer collection system should be installed for the residential area south of Tecumseh as outlined in an order dated November 27, 1972 forwarded to the Township of Sandwich South by the Director of Water Supply and Pollution Control, Ministry of the Environment, under Section 51 of the Ontario Water Resources Act.

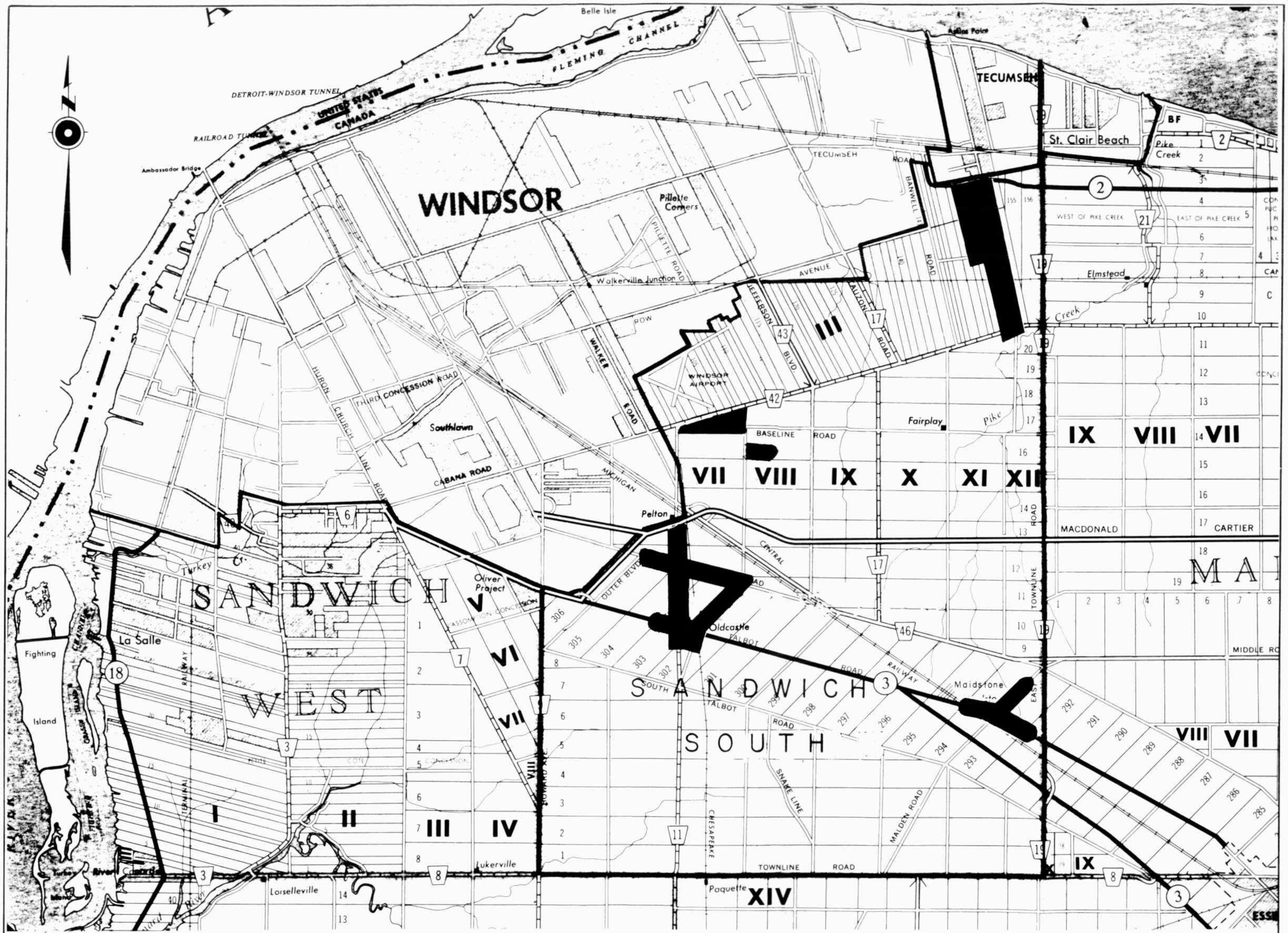
2. The Private Waste and Water Management Branch, of the Ministry of the Environment, in co-operation with the Metro Windsor-Essex County Health Unit should be requested by the municipality to undertake a study to determine the number of failing septic tanks and to recommend alternative methods of correction to prevent pollution from domestic wastes.

3. The municipality should carefully review its planning and direct development only to those areas where communal services can be provided since septic tank systems have proven to malfunction due to the generally poor soil conditions (heavy clay and/or high water table) in the Township.

Prepared by:..................................

C. W. Brink, P. Eng.
District Engineers Section
Sanitary Engineering Branch

/cs



LEGEND

■ – CONCENTRATED AREAS OF DEVELOPMENT

ENVIRONMENT ONTARIO

TOWNSHIP OF SANDWICH SOUTH

WATER POLLUTION SURVEY

1972

KEY PLAN

SCALE : 1 0 1 2 MILES

| | |
|---|---|
| DRAWN BY: L. L. B. | DATE: MAY, 1973 |
| CHECKED BY: W.B. | DRAWING Nº :73-35-DE |

# APPENDIX I

## TOWNSHIP OF SANDWICH SOUTH

## WATER POLLUTION SURVEY

# APPENDIX I

## SIGNIFICANCE OF LABORATORY RESULTS, ABBREVIATIONS AND SYMBOLS

All the laboratory tests included in this report were performed at the Ministry of the Environment laboratories in London.

### A) BACTERIOLOGICAL EXAMINATION

TOTAL COLIFORM ORGANISMS include a wide variety of bacteria ranging from the genus (Group), Escherichia Coli, which originate mainly in the intestines of man and other warm-blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers.

The presence of total coliforms in water may indicate soil runoff or more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherichia Coli group, and even to multiply when suitable environmental conditions exist.

The FECAL COLIFORM ORGANISMS are those coliform bacteria which are all intestinal origin and usually outnumber all other coliform types in human and animal intestines. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli. However, their death rate outside the warm body is the greatest and accordingly if the coliform present in the water are primarily fecal coliforms and their number is high, the pollution is probably nearby and recent. Smaller numbers but a high portion of fecal coliforms may indicate nearby pollution with counts reduced by dilution.

The results of the examinations are reported as "MF Coliform Count per 100 ml".

The Ministry's Guidelines and Criteria for Water Quality Management in Ontario (November 1972) indicate that water used for total body contact recreation can be considered impaired when the total coliform and/or fecal coliform geometric mean density exceeds 1000 and/or 100 per 100 ml respectively.

Note; the term "geometric mean" refers to a type of average; mathematically speaking, the geometric mean of a set of N numbers is the nth root of the product of the numbers; in practice, it is computed by the use of logarithms.

## B) CHEMICAL ANALYSES

### Biochemical Oxygen Demand

Biochemical Oxygen Demand (BOD) is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of the decomposable organic matter in water. The completion of the laboratory tests requires 5 days under the controlled incubation temperature of 20°C.

Biochemical oxygen demand directly affects the dissolved oxygen level within the watercourse, subsequently it must be limited in order to maintain dissolved oxygen levels in the receiving water to sustain the local aquatic life.

For warm water biota dissolved oxygen concentration should be above 5 mg/l at all times except in certain situations concentrations may range between 5 and 4 mg/l for short intervals within any 24 hour period provided that water quality is favourable in all other respects.

For cold water biota, dissolved oxygen levels should not be below 6 mg/l except in spawning areas where dissolved oxygen levels must not be below 7 mg/l at any time. In certain situations, dissolved oxygen levels may range between 6 and 5 mg/l for short intervals within any 24 hour period provided that water quality is favourable in all other respects.

## Solids

The value for solids expressed in parts per million is the sum of the values for the suspended and dissolved matter in the water. The concentration of suspended solids is generally the most significant of the solids analysis with regard to service water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams, and injury to the habitant of fish. Substances should not be added to watercourses that will adversely affect the aquatic biota or will create objectionable deposits on the bottom or shore of any body of water.

## Total Kjeldahl Nitrogen

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl, less the ammonia nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for the biological utilization.

The normal range in surface waters for Total Kjeldahl would be 0.1 to 0.5 ppm.

Phosphorus

Phosphorus is a major element of municipal sewage as well as septic tank seepage as the result of the utilization of synthetic detergents. In addition, agricultural runoff contains often high amounts of phosphorus due to the fact that fertilizers, used on the land, dissolve and leach into the drainage system.

To a certain extent, phosphorus is a highly desirable element in maintaining a proper balance between plant and animal life in water. However, excessive and prolonged discharges will upset this balance and create an over-abundance of algae, weeds and nuisance organisms. Excessive growth of algae have been found developing in lakes when the average concentrations of inorganic phosphorus was over 0.01 ppm.

## C. Abbreviations and Symbols

| | |
|---|---|
| BOD | -Biological Oxygen Demand |
| Susp. Solids | -Suspended Solids |
| Total Kjeldahl | -Total Kjeldahl Nitrogen |
| MF | -Membrane Filter |
| Ch | -32-ounce sample taken, and submitted for chemical analyses |
| Ba | -6-ounce sample taken, and submitted for bacteriological examination |
| ml | -Millilitre |
| mgd | -Million gallons per day |
| gpd | -gallons per day |
| gpm | -gallons per minute |
| < | -less than |
| > | -more than |

# APPENDIX II

## TOWNSHIP OF SANDWICH SOUTH

## WATER POLLUTION SURVEY

## SURVEY RESULTS

FIELD OBSERVATIONS　　WATER POLLUTION SURVEY　　SHEET: I A

## TOWNSHIP OF SANDWICH SOUTH

## LITTLE RIVER DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| LR-1 | North-West Corner of North Talbot Rd.and Walker Rd. Junction | Field Tile Overflow | Dripping | Smell of sanitary sewage; murky | Ba | May 9/72<br>6:25 pm | Sunny, Dry |
| LR-2 | 6th Concession Drain at North Talbot Rd.2,000 ft. west of Walker Rd. | Drain | - | Clear; drains Industrial Park | - | May 9/72<br>6:20 pm | " |
| LR-2 | Same as above | Drain | Stagnant | Smell of sanitary sewage; some deposits-no visible flow | Ba | Aug.15/72<br>10:15 am | " |
| LR-3 | 6th Concession Drain at 7th Concession Rd.450 ft. south of Baseline Rd. | Drain | Large flow | clear | Ch/Ba | May 9/72<br>9:30 am | " |
| LR-4 | 7th Street Drain south side 6th Concession Drain west side 7th Concession Rd. | Free flowing outfall | >10 gpm | clear; light foaming | Ch/Ba | May 9/72<br>9:30 am | " |
| LR-5 | Road side Ditch south side 6th Concession Drain east side 7th Concession Rd. | Ditch; free flowing | 2-5 gpm | clear; three homes upstream | Ba | May 9/72<br>9:30 | " |

ANALYSES RESULTS

## WATER POLLUTION SURVEY

SHEET: I B

## TOWNSHIP OF SANDWICH SOUTH

## LITTLE RIVER DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| LR-1 | North west corner of North Talbot Road and Walker Rd. Junction | - | - | - | - | 700,000 | 7,500,000 |
| LR-2 | 6th Concession Drain at North Talbot Rd. 2,000 ft west of Walker Rd. | - | - | - | - | - | - |
| LR-2 | Same as above | - | - | - | - | 4,000 | 75,000 |
| LR-3 | 6th Concession Drain at 7th Concession Rd. 450 ft. south of Baseline Rd. | 3.2 | 10 | 0.5 | 0.1 | 2,200 | 50,000 |
| LR-4 | 7th Street Drain south side 6th Concession Drive west side 7th Concession Rd. | 2.0 | 5 | 0.4 | 0.2 | 100 | 1,100 |
| LR-5 | Road side Ditch south side 6th Concession Drain east side 7th Concession Drain | - | - | - | - | 50,000 | 170,000 |

## TOWNSHIP OF SANDWICH SOUTH

## LITTLE RIVER DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| LR-6 | 6th Conc. Drain just west of 8th Concession Rd. | - | - | partly, cloudy; drains backyards of homes along Baseline Rd. | Ch/Ba | May 9/72 10:00 am | Sunny, Dry |
| LR-6 | Same as above | Drain | - | quite clear; over grown with reeds | Ba | Aug.15/72 11:05 am | " |
| LR-7 | 8th Concession Drain south side 6th Concession Drain west side 8th Concession Rd. | Drain, free flowing | large flow | clear; some development upstream | Ch/Ba | May 9/72 10:00 am | " |
| LR-7 | Same as above | as above | ¼ cfs | clear | Ba | Aug. 15/72 11:05 am | " |
| LR-8 | Hayes Drain at Baseline Rd. | Drain, free flowing | 5-10 gpm | clear; rapid flow; light foaming; algae growth Drains Ray and Joy Rd. | Ch/Ba | May 9/72 10:30 am | " |
| LR-8 | Same as above | as above | dry | - | - | Aug.15/72 11:20 | " |
| LR-9 | Washbrooke Drain at Old Castle Road. | Drain | - | clear; heavy algae growth | - | May 9/72 6:40 pm | " |
| LR-9 | Same as above | Drain | dry | - | - | Aug.15/72 10:35 am | " |

ANALYSES RESULTS

## WATER POLLUTION SURVEY

SHEET: II B

### TOWNSHIP OF SANDWICH SOUTH

### LITTLE RIVER DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| LR-6 | 6th Concession Drain just west of 8th Concession Rd. | 2.6 | 10 | 0.6 | 0.2 | 1,200 | 28,000 |
| LR-6 | Same as above | - | - | - | - | 1,800 | 80,000 |
| LR-7 | 8th Concession Drain south side 6th Concession Drain west side 8th Concession Drain. | 1.8 | 5 | 0.4 | 0.1 | 1,100 | 27,000 |
| LR-7 | Same as above | - | - | - | - | 9,000 | 340,000 |
| LR-8 | Hayes Drain at Baseline Rd. | 3.4 | 5 | 0.6 | 0.6 | 170 | 5,000 |
| LR-8 | Same as above | - | - | - | - |  | - |
| LR-9 | Washbrooke Drain at Old Castle Rd. | - | - | - | - | - | - |
| LR-9 | Same as above | - | - | - | - | - | - |

FIELD OBSERVATIONS WATER POLLUTION SURVEY SHEET: IIIA

TOWNSHIP OF SANDWICH SOUTH

LITTLE RIVER DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| LR-10 | 9th Concession Drain at Baseline Rd. | Drain; free flowing | large flow | clear; minor development upstream | Ba | May 9/72<br>10:45 am | Sunny, Dry |
| LR-10 | Same as above | as above | ¼ cfs | clear | - | Aug. 15/72<br>11:25 am | " |
| LR-11 | 6th Concession Drain at Baseline Rd. just west of Little River | Drain free flowing | 2-5 cfs | partly cloudy | Ch/Ba | May 9/72<br>11:00 am | " |
| LR-11 | Same as above | as above | 1 cfs slow moving | cloudy; algae growth | Ch/Ba | Aug.15/72<br>11:30 am | " |
| LR-12 | Little River at Baseline Rd. just south of 6th Concession Drain | - | - | clear; upstream no development visible | Ch/Ba | May 9/72<br>11:00 am | " |
| LR-12 | Same as above | - | - | no visible flow; clear | - | Aug.15/72<br>11:30 am | " |

ANALYSES RESULTS

WATER POLLUTION SURVEY

SHEET: III B

## TOWNSHIP OF SANDWICH SOUTH

## LITTLE RIVER DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| LR-10 | 9th Concession Drain at Baseline Rd. | - | - | - | - | 2,100 | 46,000 |
| LR-10 | Same as above | - | - | - | - | - | - |
| LR-11 | 6th Concession Drain at Baseline Rd. just west of Little River. | 2.4 | 10 | 0.5 | 0.2 | 1,000 | 70,000 |
| LR-11 | Same as above | 5.0 | 20 | 0.6 | 0.4 | 500 | 140,000 |
| LR-12 | Little River at Baseline Road just south of 6th Concession Drain. | 0.8 | 10 | 0.4 | 0.3 | 160 | 150,000 |
| LR-12 | Same as above | - | - | - | - | - | - |

FIELD OBSERVATIONS WATER POLLUTION SURVEY SHEET: IV A

## TOWNSHIP OF SANDWICH SOUTH

## LITTLE RIVER DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| LR-13 | Storm sewer outfall to Gouin Drain at Shawnee Rd. 200 ft.north of Maissonneuve Rd. | storm sewer 30"-Ø partly submerged | 13" water depth<br>2 gpm | heavy smell of sanitary sewage; blk deposits health hazard | Ch/Ba | April 11/72<br>5:30 pm | Sunny, Dry |
| LR-13 | Same as above | as above | 2-5 gpm | smell of sanitary sewage; murky; some deposits | Ba | May 9/72<br>2:00 pm | " |
| LR-13 | Same as above | as above | ¼ gpm | smell of sanitary sewage black deposits; over-growth with reeds | Ba | Aug.15/72<br>2:55 pm | " |
| LR-14 | Storm sewer outfall to Gouin Drain 200 ft.north of Gouin St.and 300 ft. west of Shawnee Rd. | storm sewer free flowing outfall | 2-5 gpm | smell of sanitary sewage; murky blk deposits; drains Shawnee Steakhouse Tavern | Ch/Ba | May 9/72<br>2:15 pm | " |
| LR-14 | Same as above | as above | 1 gpm | smell of sanitary sewage; black deposits; health hazard | Ch/Ba<br>Photo #1 | Aug.15/72<br>3:05 pm | " |
| LR-15 | Gouin Drain at Banwell Rd. | Drain | 10-20 gpm | cloudy; sluggish flow; floating algae debris | Ch/Ba | May 9/72<br>2:55 pm | " |
| LR-15 | Same as above | Drain | 2-5 gpm | heavy algae growth sluggish flow | Ba | Aug.15/72<br>3:35 | " |

ANALYSES RESULTS

WATER POLLUTION SURVEY

SHEET: IV B

## TOWNSHIP OF SANDWICH SOUTH

## LITTLE RIVER DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| LR-13 | Storm sewer outfall to Gouin Drain at Shawnee Rd. 200 ft. north of Maissonneuve Rd. | 45 | 10 | 16 | 7.8 | 600 | 1,700,000 |
| LR-13 | Same as above | - | - | - | - | 50,000 | 270,000 |
| LR-13 | Same as above | - | - | - | - | 35,000 | 150,000 |
| LR-14 | Storm sewer outfall to Gouin Drain 200 ft.north of Gouin St. and 300 ft. west of Shawnee Rd. | 22 | 5 | 8.0 | 2.4 | 75,000 | 89,000 |
| LR-14 | Same as above | 110 | 50 | 14 | 2.0 | 20,000 | 130,000 |
| LR-15 | Gouin Drain at Banwell Rd. | 4.6 | 10 | 1.8 | 1.0 | 72 | 13,000 |
| LR-15 | Same as above | - | - | - | - | 8,800 | 111,000 |

## TOWNSHIP OF SANDWICH SOUTH

## LITTLE RIVER DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| LR-16 | Lauzon Rd.Drain just south of Little River east side Lauzon Rd. | Drain, free flowing | > 20 gpm | clear; heavy algae growth; drains some dev. along Lauzon Rd. & County Rd.42 | Ba | May 9/72 3:15 pm | Sunny, Dry |
| LR-17 | Little River just west of Lauzon Rd. | - | - | partly cloudy | Ch/Ba | May 9/72 3:15 pm | " |
| LR-18 | Lepain Drain at Jefferson Rd. | - | 20 gpm | partly cloudy; drains perhaps Airport | Ba | Apr.14/72 3:40 pm | " |
| LR-19 | Russette Drain at Jefferson Rd. | - | - | thick black layer of oil covers drain | Ch photo#2 | Apr.14/72 9:30 am | " |
| LR-19 | As above | | | clear; no evidence of oil spill; heavy algae growth | Ch/Ba | May 9/72 3:50 pm | " |

## TOWNSHIP OF SANDWICH SOUTH

## LITTLE RIVER DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| LR-16 | Lauzon Rd. Drain just south of Little River east side Lauzon Rd. | - | - | - | - | 500 | 6,000 |
| LR-17 | Little River just west of Lauzon Rd. | <0.5 | 5 | 0.5 | 0.2 | 300 | 30,000 |
| LR-18 | Lepain Drain at Jefferson Rd. | - | - | - | - | 20 | 31,000 |
| LR-19 | Russette Drain at Jefferon Rd. | thick dark brown oil under examination was characterized as a light grade bunker fuel oil | | | | | |
| LR-19 | Same as above | 1.8 | <5 | 0.4 | 0.1 | <4 | 100 |

## WATER POLLUTION SURVEY

### TOWNSHIP OF SANDWICH SOUTH

### PIKE CREEK DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| PC-1 | Gzowski Drain at Talbot Rd (Hwy.No. 3) | - | - | clear; some algae growth | - | May 9/72 7:20 pm | Sunny, Dry |
| PC-2 | Malden Rd.Drain East, just south of Pike Creek | Drain; free flowing | - | slight smell of sanitary sewage; (drains hamlet of Maidstone) | Ch/Ba | May 9/72 7:00 pm | " |
| PC-2 | Same as above | as above | ¼ gpm | heavy algae growth; black deposits; clear | Ba | Aug. 15/72 4:10 pm | " |
| PC-3 | Pike Creek, just east of Malden Rd. | - | - | clear | Ba | May 9/72 6:55 pm | " |
| PC-3 | Same as above | - | dry | - | - | Aug.15/72 4:10 pm | " |
| PC-4 | West Townline Drain at Hwy.No. 98 | - | - | clear | - | May 9/72 6:50 pm | " |
| PC-5 | Delisle Drain at Hwy.No.98 | - | - | clear; heavy algae growth | - | May 9/72 6:45 pm | " |
| PC-6 | 10th Concession Drain at Baseline Rd.just west of Sullivan Creek | Drain; free flowing | > 20 gpm | clear; light foaming; drains some minor dev. | Ba | May 9/72 11:30 am | " |
| PC-6 | Same as above | as above | 20 gpm | clear | - | Aug.15/72 11:40 am | " |

ANALYSES RESULTS

WATER POLLUTION SURVEY

SHEET: VI B

TOWNSHIP OF SANDWICH SOUTH

PIKE CREEK DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| PC-1 | Gzowski Drain at Talbot Rd. (Hwy. No. 3) | - | - | - | - | - | - |
| PC-2 | Malden Rd. Drain East just south of Pike Creek | 2.8 | 10 | 0.6 | 0.2 | 1,490 | 60,000 |
| PC-2 | Same as above | - | - | - | - | 9,000 | 320,000 |
| PC-3 | Pike Creek just east of Malden Rd. | - | - | - | - | 90 | 1,100 |
| PC-3 | Same as above | - | - | - | - | - | - |
| PC-4 | West Townsline Drain at Hwy. No. 98 | - | - | - | - | - | - |
| PC-5 | Delisle Drain at Hwy. No. 98 | - | - | - | - | - | - |
| PC-6 | 10th Concession Drain at Baseline Rd. just west of Sullivan Creek | - | - | - | - | 100 | 1,800 |
| PC-6 | Same as above | - | - | - | - | - | - |

FIELD OBSERVATIONS WATER POLLUTION SURVEY SHEET:VIIA

TOWNSHIP OF SANDWICH SOUTH

PIKE CREEK DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| PC-7 | Sullivan Creek at Baseline Rd. just south of 10th Concession Drain | Creek | >1 cfs | clear; floating algae debris | Ch/Ba | May 9/72<br>11:30 am | Sunny, Dry |
| PC-7 | Same as above | Creek | | overgrown with reeds; partly cloudy | - | Aug.15/72<br>11:40 am | " |
| PC-8 | Pike Creek at Baseline Rd. and Lesperance Rd. | Creek | >2 cfs | slightly cloudy | Ba | May 9/72<br>11:55 am | " |
| PC-8 | Same as above | Creek | >2 cfs | muddy | - | Aug.15/72<br>11:50 am | " |
| PC-9 | East Townline Drain at Baseline Rd. just east of Pike Creek | Drain; free flowing | >50 gpm | clear; light foaming | Ba | May 9/72<br>11:55 am | " |
| PC-9 | Same as above | as above | 1 cfs | clear; slight foaming | Ba | Aug.15/72<br>11:50 am | " |
| PC-10 | Pike Creek at Lesperance Rd. 3,400 ft.south of County Rd. No. 42 | Creek | - | clear; rapid flowing | Ch/Ba | Apr.11/72<br>11:50 am | " |
| PC-10 | Same as above | Creek | <2 cfs | muddy | Ch/Ba | Aug.15/72<br>12:00 pm | " |

ANALYSES RESULTS

WATER POLLUTION SURVEY

SHEET: VII B

TOWNSHIP OF SANDWICH SOUTH

PIKE CREEK DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| PC-7 | Sullivan Creek at Baseline Rd. just south of 10th Concession Drain | 5 | 10 | 0.6 | 0.2 | 400 | 23,000 |
| PC-7 | Same as above | - | - | - | - | - | - |
| PC-8 | Pike Creek at Baseline Rd. and Lesperance Rd. | - | - | - | - | 40 | 2,300 |
| PC-8 | Same as above | - | - | - | - | - | - |
| PC-9 | East Townline Drain at Baseline Rd. just east of Pike Creek. | - | - | - | - | 130 | 220 |
| PC-9 | Same as above | - | - | - | - | 400 | 130,000 |
| PC-10 | Pike Creek at Lesperance Rd. 3,400 ft. south of County Rd. No. 42 | 3.4 | 10 | 1.4 | 0.3 | < 4 | 160 |
| PC-10 | Same as above | 10 | 90 | 1.0 | 0.2 | 700 | 200,000 |

## TOWNSHIP OF SANDWICH SOUTH

## PIKE CREEK DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| PC-11 | Ditch east side Lesperance Rd. south side Pike Creek 1,250 ft. south of County Rd. No. 42 | free flowing outfall | < 1/8 gpm | clear | - | Apr.11/72<br>12:00 pm | Sunny, Dry |
| PC-12 | Storm sewer at west side Lesperance Rd. north side Pike Creek, 1,250 ft. south of County Rd. No. 42 | 19" free flowing outfall | 1/8 gpm | quite clear; smell of sanitary sewage; slight foaming | Ch/Ba | Apr.11/72<br>12:10 pm | " |
| PC-13 | Klondyke Drain at County Road No. 42; 500 ft. west of Lesperance Rd. | Ditch | - | clear; drains some dev. along County Rd. No.42 | Ba | May 9/72<br>1:35 pm | " |
| PC-14 | Klondyke Drain at Lesperance Rd. 300 ft. south of County Rd. No. 42. | - | rapid flow | quite clear<br>no smell | Ch/Ba | Apr.11/72<br>12:30 pm | " |
| PC-15 | Storm sewer outfall to Pike Creek at County Rd. No. 42; 300 ft. east of Lesperance Rd. | approx. 20" concrete storm sewer free flowing | 5-10 gpm<br>1" W.D. | slight smell of sanitary sewage; no deposits<br>clear - drains Lesperance Rd. | Ch/Ba | May 9/72<br>12:45 pm | " |
| PC-15 | Same as above | as above | ½" W.D.<br>¼ cfs | smell of sanitary sewage; clear - foaming | Ch/Ba<br>Photo #3 | Aug.15/72<br>12:15 pm | " |

## TOWNSHIP OF SANDWICH SOUTH

## PIKE CREEK DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| PC-11 | Ditch east side Lesperance Rd. south side Pike Creek 1,250 ft. south of County Rd. No.42 | - | - | - | - | - | - |
| PC-12 | Storm sewer at West side Lesperance Rd. north side Pike Creek 1,250 ft. south of County Rd. No.42 | 19 | 20 | 26 | 5.2 | 12,000 | 100,000 |
| PC-13 | Klondyke Drain at County Rd. No. 42; 500 ft. west of Lesperance Rd. | - | - | - | - | 2,500 | 600,000 |
| PC-14 | Klondyke Drain at Lesperance Rd. 300 ft. south of County Road No. 42 | 3.8 | 10 | 2.4 | 1.0 | 170 | 22,000 |
| PC-15 | Storm sewer outfall to Pike Creek at County Rd. No. 42; 300 ft. east of Lesperance Rd. | 11 | 10 | 6.0 | 1.9 | 60,000 | 120,000 |
| PC-15 | Same as above | 46 | 20 | 14 | 3.0 | 25,000 | 140,000 |

FIELD OBSERVATIONS WATER POLLUTION SURVEY SHEET: IXA

TOWNSHIP OF SANDWICH SOUTH

PIKE CREEK DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| PC-16 | East Townsline Drain at Pike Creek and Manning Rd. | Drain - free flowing | 5-10 gpm | clear; no development | - | May 9/72<br>12:20 pm | Sunny, Dry |
| PC-16 | Same as above | as above | ¼ cfs | clear | - | Aug.15/72<br>12:45 pm | " |
| PC-17 | Pike Creek just east of Manning Rd. | Creek | - | cloudy | Ch/Ba | May 9/72<br>12:20 pm | " |
| PC-17 | Same as above | Creek | - | muddy | Ch/Ba | Aug.15/72<br>12:45 pm | " |

## WATER POLLUTION SURVEY

## TOWNSHIP OF SANDWICH SOUTH

## PIKE CREEK DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| PC-16 | East Townline Drain at Pike Creek and Manning Rd. | - | - | - | - | - | - |
| PC-16 | Same as above | - | - | - | - | - | - |
| PC-17 | Pike Creek just east of Manning Rd. | 3.0 | 20 | 0.8 | 0.2 | 400 | 100,000 |
| PC-17 | Same as above | 9.5 | 140 | 1.2 | 0.3 | 6,000 | 90,000 |

FIELD OBSERVATIONS — WATER POLLUTION SURVEY — SHEET: X A

TOWNSHIP OF SANDWICH SOUTH

MANNING DRAIN AND MISC.DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| MD-1 | Storm sewer system; manhole west side Lesperance Rd. 250 ft. north of Intersection Rd. | - | 1 gpm | smell of sanitary sewage; murky; black deposits; health hazard | Ch/Ba | Apr.11/72 3:00 pm | Sunny, Dry |
| MD-2 | Ditch, east side of Lesperance Rd. 250 ft. north of Intersection Rd. | free flowing outfall | 2 gpm | no dev.along east side of Lesperance Rd. clear; no deposits | Ba | Apr.11/72 3:10 pm | " |
| MD-2 | Same as above | as above | dry | - | - | Aug.15/72 2:30 pm | " |
| MD-3 | Storm sewer outfall to Baillargeon Drain at Lesperance Rd. 250 ft. north of Intersection Rd. | partly submerged outfall 48" storm sewer | 5-10 gpm 13" depth | smell of sanitary sewage; black deposits; drains sub.type dev. along St.Anne St. | Ch/Ba | Apr.11/72 3:10 pm | " |
| MD-3 | Same as above | as above | 10-20 gpm | clear; slight smell of sanitary sewage; some deposits | Ch/Ba | May 9/72 1:50 pm | " |

## TOWNSHIP OF SANDWICH SOUTH

## MANNING DRAIN AND MICS.DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| MD-1 | Storm sewer system manhole west side Lesperance Rd. 250 ft. north of Intersection Rd. | 11 | 10 | 8.2 | 3.3 | 19,000 | 500,000 |
| MD-2 | Ditch east side of Lesperance Rd. 250 ft. north of Intersection Rd. | - | - | - | - | < 4 | 190,000 |
| MD-2 | Same as above | - | - | - | - | - | - |
| MD-3 | Storm sewer outfall to Baillargeon Drain at Lesperance Rd. 250 ft. north of Intersection Rd. | 11 | 5 | 8.2 | 3.4 | 20,000 | 24,000 |
| MD-3 | Same as above | 9.5 | 5 | 4.7 | 2.0 | 31,000 | 500,000 |

FIELD OBSERVATIONS WATER POLLUTION SURVEY SHEET: XI A

## TOWNSHIP OF SANDWICH SOUTH

## MANNING DRAIN AND MISC.DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| MD-3 | Storm sewer outfall to Baillargeon Drain at Lesperance Rd. 250 ft. north of Intersection Rd. | partly submerged outfall 48" storm sewer | ¼ cfs | smell of sanitary sewage; black deposits murky | Ba<br>Photo #4 | Aug.15/72<br>2:30 pm | " |
| MD-4 | Baillargeon Drain at Manning Rd. | Drain | 10-20 gpm | clear<br>light foaming | Ch/Ba | May 9/72<br>12:55 pm | " |
| MD-4 | Same as above | as above | ¼ cfs | quite clear; overgrown with reeds | Ba | Aug.15/72<br>1:00 pm | " |
| MD-5 | Roadside Ditch west side of Lesperance Rd. just south of Hwy. No. 2 | | 1 gpm | smell of sanitary sewage, murky; black deposits; health hazard | Ch/Ba<br>Photo #5<br>Photo#6 | Apr.11/72<br>4:30 pm | " |
| MD-6 | Storm sewer outfall to Ditch, west side Shawnee Rd. just south of Hwy. No. 2 | partly submerged outfall 18" storm sewer | ¼ gpm<br>6" depth | smell of sanitary sewage black deposits health hazard | Ba | Apr.11/72<br>4:50 pm | " |
| MD-7 | Roadside Ditch west side of Shawnee Rd. opposite 1775 Shawnee Rd. | - | - | smell of sanitary sewage; murky; health hazard | Ba | Apr.11/72<br>5:10 pm | " |

## WATER POLLUTION SURVEY

### TOWNSHIP OF SANDWICH SOUTH

### MANNING DRAIN AND MISC. DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| MD-3 | Same as above | - | - | - | - | 28,000 | 3,700,000 |
| MD-4 | Baillargeon Drain at Manning Rd. | 5.0 | 10 | 1.4 | 1.0 | 180 | 280,000 |
| MD-4 | Same as above | - | - | - | - | 4,000 | 100,000 |
| MD-5 | Road side Ditch west side of Lesperance just south of Hwy. No. 2 | 65 | 270 | 11. | 1.2 | 100,000 | 290,000 |
| MD-6 | Storm sewer outfall to Ditch west side Shawnee Rd. just south of Hwy. No. 2 | - | - | - | - | 1,800,000 | 13,000,000 |
| MD-7 | Road side Ditch west side Shawnee Rd. opposite 1775 Shawnee Rd. | - | - | - | - | 200 | 3,400,000 |

FIELD OBSERVATIONS

WATER POLLUTION SURVEY

SHEET: $XII_A$

TOWNSHIP OF SANDWICH SOUTH

RIVER CANARD DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| RC-1 | Burke Drain at Outer Blvd. and South Talbot Rd. | Drain | 5 gpm | clear | - | May 9/72<br>5:30 pm | Sunny, Dry |
| RC-1 | Same as above | Drain | dry | - | - | Aug.15/72<br>8:40 am | " |
| RC-2 | Dickson Drain just south of South Talbot Rd. | Drain | - | quite clear, floating algae debris | Ba | May 9/72<br>5:35 pm | " |
| RC-3 | South Talbot Holden Outlet Drain at South Talbot Rd. and 6th Concession Rd. | Drain | - | clear | - | May 9/72<br>5:45 pm | " |
| RC-3 | Same as above | Drain | dry | - | - | Aug.15/72<br>9:30 am | " |
| RC-4 | South Talbot Drain and Old Castle Drain at Old Castle Rd. and South Talbot Rd. | Drain | - | clear - heavy algae growth | - | May 9/72<br>5:50 pm | " |
| RC-4 | Same as above | Drain | no visible flow | stagnant | - | Aug.15/72<br>9:35 am | " |

## TOWNSHIP OF SANDWICH SOUTH

## RIVER CANARD DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| RC-1 | Burke Drain at Outer Blvd. and South Talbot Rd. | - | - | - | - | - | - |
| RC-1 | Same as above | - | - | - | - | - | - |
| RC-2 | Dickson Drain just south of South Talbot Rd. | - | - | - | - | <4 | 400 |
| RC-3 | South Talbot Holden Outlet Drain at South Talbot Rd. and 6th Concession Rd. | - | - | - | - | - | - |
| RC-3 | Same as above | - | - | - | - | - | - |
| RC-4 | South Talbot Drain and Old Castle Drain at Old Castle Rd. and South Talbot Rd. | - | - | - | - | - | - |
| RC-4 | Same as above | - | - | - | - | - | - |

FIELD OBSERVATIONS WATER POLLUTION SURVEY SHEET: XIIIA

TOWNSHIP OF SANDWICH SOUTH

RIVER CANARD DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| RC-5 | Holden and South Talbot Drain at Merrick Creek and 6th Concession Rd. east side | Drain; free flowing outfall | 1/8 gpm | clear - drains some dev. along 6th Concession Rd. | Ba | Aug.15/72 9:10 am | Inter-mittent clouds & dry |
| RC-6 | Merrick Creek just east of 6th Concession Rd. | Creek | 1-2 gpm | partly cloudy appears quite stagnant | Ch/Ba | Aug.15/72 9:10 am | " |
| RC-7 | Merrick Creek at Howard Avenue | Creek | ½ cfs | partly cloudy | Ba | Aug.15/72 8:55 am | " |

## WATER POLLUTION SURVEY

## TOWNSHIP OF SANDWICH SOUTH

## RIVER CANARD DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| RC-5 | Holden and South Talbot Drain at Merrick Creek and 6th Concession Rd. east | - | - | - | - | 12,000 | 80,000 |
| RC-6 | Merrick Creek just east of 6th Concession Rd. | 9.0 | 10 | 0.8 | 0.2 | 120 | 120,000 |
| RC-7 | Merrick Creek at Howard Avenue. | - | - | - | - | <4 | 200,000 |

## TOWNSHIP OF SANDWICH SOUTH

## TURKEY CREEK DRAINAGE BASIN

| Observ./ Sampling Point | Description of Sampling Point | Kind of Outfall | Estimated Flow | Observations | Action | Day and Time of Sampling | Weather during Survey |
|---|---|---|---|---|---|---|---|
| TC-1 | Field tile at Walker Rd. and Wolfe Drain. | - | 10-20 gpm | clear | Ch/Ba | May 9/72 7:30 pm | Sunny Dry |
| TC-1 | Same as above | - | dry | - | - | Aug.15/72 10:30 pm | " |
| TC-2 | Collins Drain at 300 ft. west of Walkers Rd., north side Hwy. No. 3 | storm sewer partly submerged | 2 gpm | smell of sanitary sewage, murky; black deposits; drains dev. on jct. of Walkers Rd. & Hwy. No. 3 | Ch/Ba | May 9/72 5:55 pm | " |
| TC-2 | Same as above | as above | | smell of sanitary sewage, cloudy | Ch/Ba | Aug.15/72 9:45 am | Intermittent Cloudy & Dry |
| TC-3 | Wolfe Drain at Outer Blvd. just north of Hwy. No. 3 | Drain free flowing | 10-20 gpm | clear, some algae growth, some foaming | Ch/Ba | May 9/72 6:10 pm | Sunny, Dry |
| C-3 | Same as above | as above | 1 cfs | clear, light foaming | - | Aug.15/72 9:55 am | " |
| C-3 | Same as above | as above | ¼ cfs | clear | - | Aug.15/72 4:30 pm | " |
| C-4 | Wolfe Drain 30 ft west of Outer Blvd. | Drain | 1 cfs | clear | Ch/Ba | Aug.15/72 9:55 am | " |

ANALYSES RESULTS

WATER POLLUTION SURVEY

SHEET: XIV B

TOWNSHIP OF SANDWICH SOUTH

TURKEY CREEK DRAINAGE BASIN

| Sampling Point | Description of Sampling Point | 5-Day BOD (ppm) | Susp. Solids (ppm) | Total Kjeldahl (ppm) | Total Phosphorus (ppm) | Faecal Coliform Count per 100 ml. | MF Coliform Count per 100 ml. |
|---|---|---|---|---|---|---|---|
| TC-1 | Field Tile at Walker Rd. and Wolfe Drain | <0.5 | <5 | 0.2 | <0.1 | 280 | 1,600 |
| TC-1 | Same as above | - | - | - | - | - | - |
| TC-2 | Collins Drain at 300 ft. west of Walkers Rd. north side Hwy. No. 3 | 10 | 30 | 1.2 | 1.2 | 14,100 | 270,000 |
| TC-2 | Same as above | 20 | 80 | 2.0 | 1.6 | 11,000 | 27,000 |
| TC-3 | Wolfe Drain at Outer Blvd just north of Hwy. No. 3 | 3.0 | <5 | 0.4 | 0.1 | 110 | 470 |
| TC-3 | Same as above | - | - | - | - | - | - |
| TC-3 | Same as above | - | - | - | - | - | - |
| TC-4 | Wolfe Drain 30 ft. west of Outer Blvd. | 10 | 10 | 1.2 | 0.7 | 20,000 | 70,000 |

# APPENDIX III

# TOWNSHIP OF SANDWICH SOUTH

# PICTORIAL SURVEY

April, August 1972

Photo No. 1

Storm sewer outfall to Gouin Drain 200 feet north of Gouin Street and 300 feet west of Shawnee Road (LR-14)

Storm sewer drains the Shawnee Steakhouse Tavern

OBSERVATIONS:
- smell of sanitary sewage
- black deposits
- health hazard

| $BOD_5$ (ppm) | Susp. Solids (ppm) | Fecal Coliform Count per 100 ml |
|---|---|---|
| 110 | 50 | 20,000 |

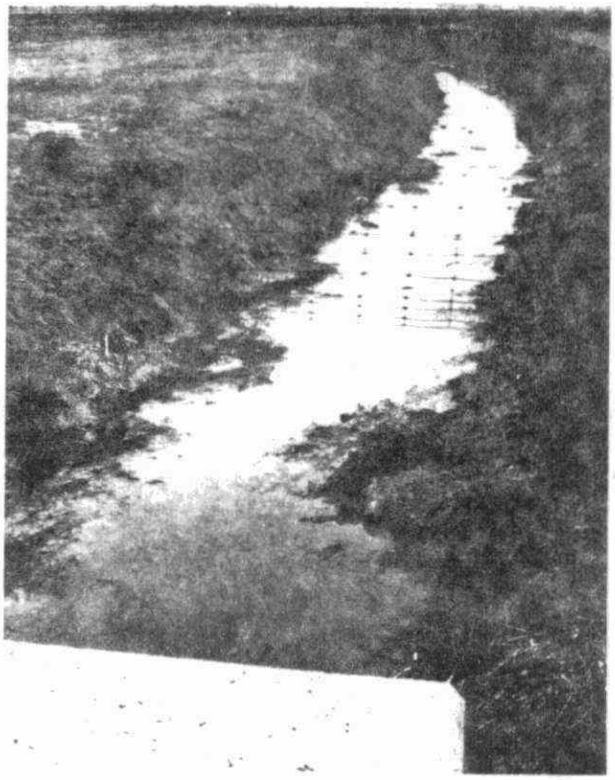


Photo No. 2

Russette Drain at Jefferson Road.

Thick black layer of oil covered the drain.

Thick dark brown oil was characterized as a light grade bunker fuel oil.

Photo No. 3

Storm sewer outfall to Pike Creek at County Road No. 42, 300 feet east of Lesperance Road (PC-15).

Storm sewer drains Lesperance Road.

OBSERVATIONS:

- smell of sanitary sewage
- foaming

| $BOD_5$ (ppm) | Susp. Solids (ppm) | Faecal Coliform Count per 100 ml |
|---|---|---|
| 46 | 20 | 25,000 |

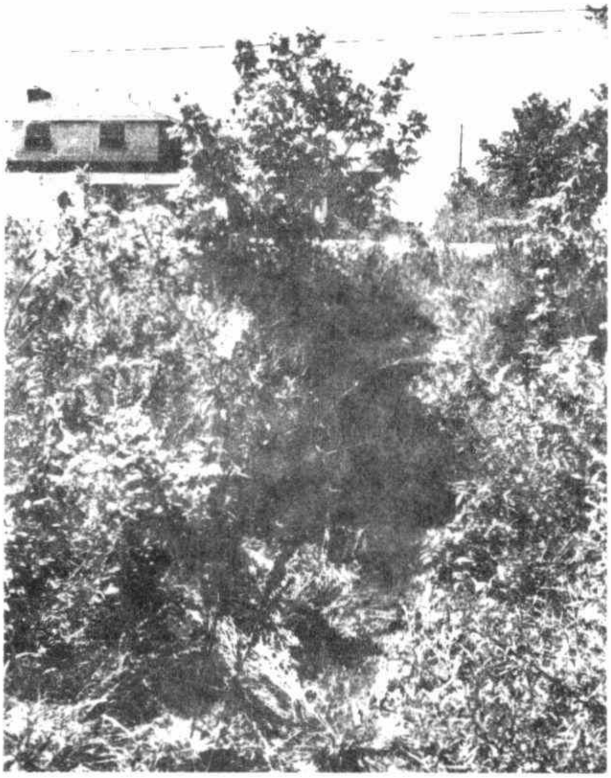


Photo No. 4

Storm sewer outfall to Baillargeon Drain at Lesperance Road 250 ft. north of Intersection Road (MD-3); storm sewer drains development along St. Anne Street.

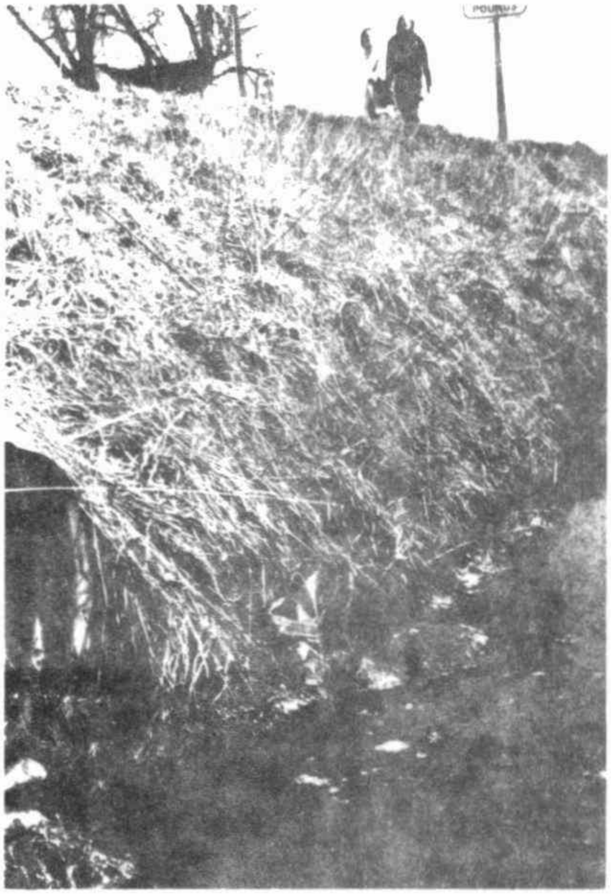
| $BOD_5$ (ppm) | Susp. Solids (ppm) | Faecal Coliform Count per 100 ml |
|---|---|---|
| 11 | 5 | 28,000 |

Photo No. 5 & No. 6

Roadside ditch west side of Lesperance Road just south of Highway No. 2 (MD-5)

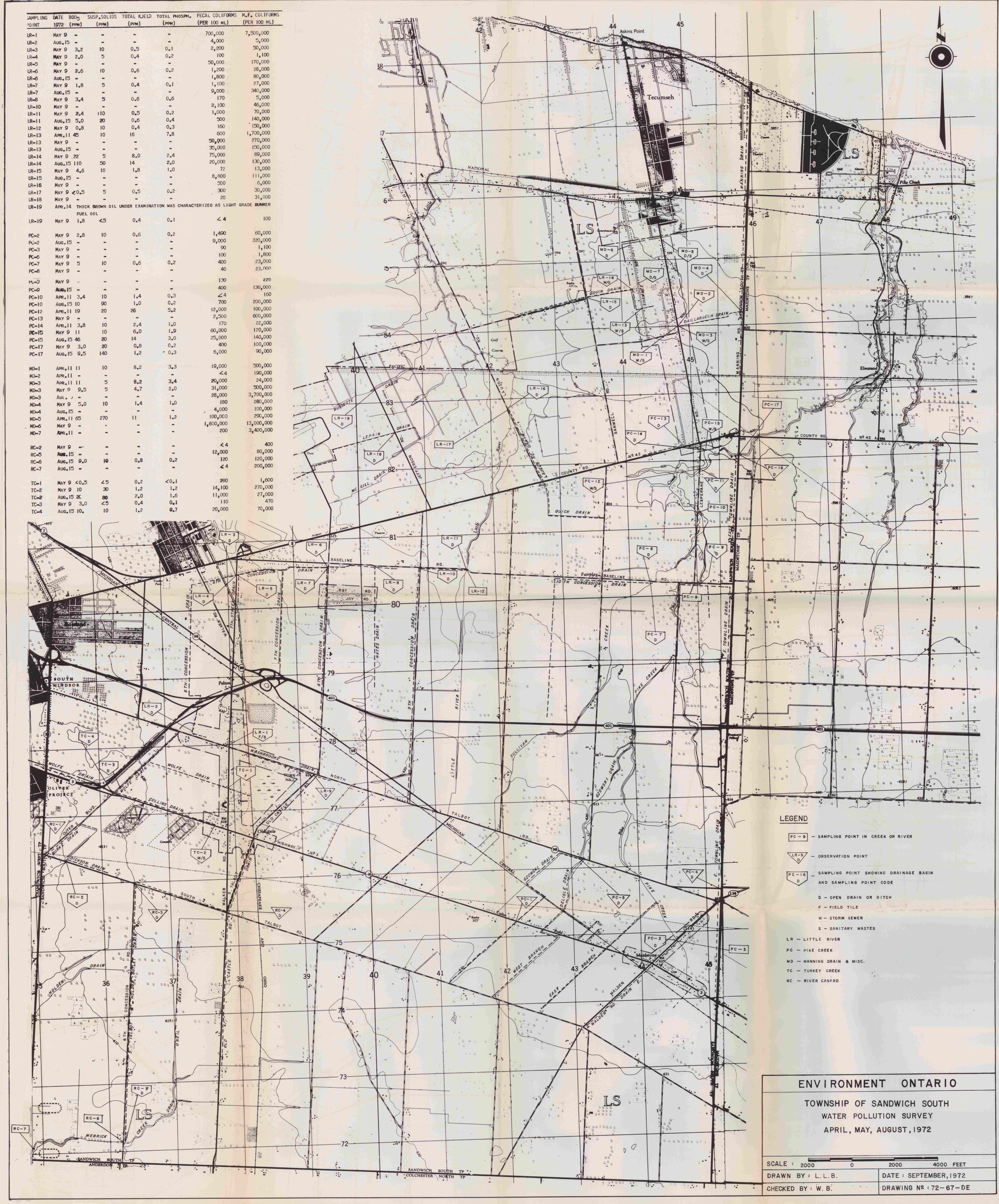
OBSERVATIONS:
- smell of sanitary sewage
- black deposits
- public health hazard

| $BOD_5$ (ppm) | Susp. Solids (ppm) | Faecal Coliform Count per 100 ml |
|---|---|---|
| 65 | 270 | 100,000 |



SANDWICH SOUTH

| SAMPLING POINT | DATE 1972 | $BOD_5$ (PPM) | SUSP. SOLIDS (PPM) | TOTAL KJELD (PPM) | TOTAL PHOSPH. (PPM) | FECAL COLIFORMS (PER 100 ML) | M.F. COLIFORMS (PER 100 ML) |
|---|---|---|---|---|---|---|---|
| LR-1 | MAY 9 | - | - | - | - | 700,000 | 7,500,000 |
| LR-2 | AUG.15 | - | - | - | - | 4,000 | 5,000 |
| LR-3 | MAY 9 | 3.2 | 10 | 0.5 | 0.1 | 2,200 | 50,000 |
| LR-4 | MAY 9 | 2.0 | 5 | 0.4 | 0.2 | 100 | 1,100 |
| LR-5 | MAY 9 | - | - | - | - | 50,000 | 170,000 |
| LR-6 | MAY 9 | 2.6 | 10 | 0.6 | 0.2 | 1,200 | 28,000 |
| LR-6 | AUG.15 | - | - | - | - | 1,800 | 80,000 |
| LR-7 | MAY 9 | 1.8 | 5 | 0.4 | 0.1 | 1,100 | 27,000 |
| LR-7 | AUG.15 | - | - | - | - | 9,000 | 340,000 |
| LR-8 | MAY 9 | 3.4 | 5 | 0.6 | 0.6 | 170 | 5,000 |
| LR-10 | MAY 9 | - | - | - | - | 2,100 | 46,000 |
| LR-11 | MAY 9 | 2.4 | 110 | 0.5 | 0.2 | 1,000 | 70,000 |
| LR-11 | AUG.15 | 5.0 | 20 | 0.6 | 0.4 | 500 | 140,000 |
| LR-12 | MAY 9 | 0.8 | 10 | 0.4 | 0.3 | 160 | 150,000 |
| LR-13 | APR.11 | 45 | 10 | 16 | 7.8 | 600 | 1,700,000 |
| LR-13 | MAY 9 | - | - | - | - | 50,000 | 270,000 |
| LR-13 | AUG.15 | - | - | - | - | 35,000 | 150,000 |
| LR-14 | MAY 9 | 22 | 5 | 8.0 | 2.4 | 75,000 | 89,000 |
| LR-14 | AUG.15 | 110 | 50 | 14 | 2.0 | 20,000 | 130,000 |
| LR-15 | MAY 9 | 4.6 | 10 | 1.8 | 1.0 | 72 | 13,000 |
| LR-15 | AUG.15 | - | - | - | - | 8,800 | 111,000 |
| LR-16 | MAY 9 | - | - | - | - | 500 | 6,000 |
| LR-17 | MAY 9 | <0.5 | 5 | 0.5 | 0.2 | 300 | 30,000 |
| LR-18 | MAY 9 | - | - | - | - | 20 | 31,000 |
| LR-19 | APR.14 | THICK BROWN OIL UNDER EXAMINATION WAS CHARACTERIZED AS LIGHT GRADE BUNKER FUEL OIL | | | | | |
| LR-19 | MAY 9 | 1.8 | <5 | 0.4 | 0.1 | <4 | 100 |
| | | | | | | | |
| PC-2 | MAY 9 | 2.8 | 10 | 0.6 | 0.2 | 1,490 | 60,000 |
| PC-2 | AUG.15 | - | - | - | - | 9,000 | 320,000 |
| PC-3 | MAY 9 | - | - | - | - | 90 | 1,100 |
| PC-6 | MAY 9 | - | - | - | - | 100 | 1,800 |
| PC-7 | MAY 9 | 5 | 10 | 0.6 | 0.2 | 400 | 23,000 |
| PC-8 | MAY 9 | - | - | - | - | 40 | 23,000 |
| PC-9 | MAY 9 | - | - | - | - | 130 | 220 |
| PC-9 | AUG.15 | - | - | - | - | 400 | 130,000 |
| PC-10 | APR.11 | 3.4 | 10 | 1.4 | 0.3 | <4 | 160 |
| PC-10 | AUG.15 | 10 | 90 | 1.0 | 0.2 | 700 | 200,000 |
| PC-12 | APR.11 | 19 | 20 | 26 | 5.2 | 12,000 | 100,000 |
| PC-13 | MAY 9 | - | - | - | - | 2,500 | 600,000 |
| PC-14 | APR.11 | 3.8 | 10 | 2.4 | 1.0 | 170 | 22,000 |
| PC-15 | MAY 9 | 11 | 10 | 6.0 | 1.9 | 60,000 | 120,000 |
| PC-15 | AUG.15 | 46 | 20 | 14 | 3.0 | 25,000 | 140,000 |
| PC-17 | MAY 9 | 3.0 | 20 | 0.8 | 0.2 | 400 | 100,000 |
| PC-17 | AUG.15 | 9.5 | 140 | 1.2 | 0.3 | 6,000 | 90,000 |
| | | | | | | | |
| MD-1 | APR.11 | 11 | 10 | 8.2 | 3.3 | 19,000 | 500,000 |
| MD-2 | APR.11 | - | - | - | - | <4 | 190,000 |
| MD-3 | APR.11 | 11 | 5 | 8.2 | 3.4 | 20,000 | 24,000 |
| MD-3 | MAY 9 | 9.5 | 5 | 4.7 | 2.0 | 31,000 | 500,000 |
| MD-3 | AUG.15 | - | - | - | - | 28,000 | 3,700,000 |
| MD-4 | MAY 9 | 5.0 | 10 | 1.4 | 1.0 | 180 | 280,000 |
| MD-4 | AUG.15 | - | - | - | - | 4,000 | 100,000 |
| MD-5 | APR.11 | 65 | 270 | 11 | 1.2 | 100,000 | 290,000 |
| MD-6 | MAY 9 | - | - | - | - | 1,800,000 | 13,000,000 |
| MD-7 | APR.11 | - | - | - | - | 200 | 3,400,000 |
| | | | | | | | |
| RC-2 | MAY 9 | - | - | - | - | <4 | 400 |
| RC-5 | AUG.15 | - | - | - | - | 12,000 | 80,000 |
| RC-6 | AUG.15 | 9.0 | 10 | 0.8 | 0.2 | 120 | 120,000 |
| RC-7 | AUG.15 | - | - | - | - | <4 | 200,000 |
| | | | | | | | |
| TC-1 | MAY 9 | <0.5 | <5 | 0.2 | <0.1 | 280 | 1,600 |
| TC-2 | MAY 9 | 10 | 30 | 1.2 | 1.2 | 14,100 | 270,000 |
| TC-2 | AUG.15 | 20 | 80 | 2.0 | 1.6 | 11,000 | 27,000 |
| TC-3 | MAY 9 | 3.0 | <5 | 0.4 | 0.1 | 110 | 470 |
| TC-4 | AUG.15 | 10. | 10 | 1.2 | 0.7 | 20,000 | 70,000 |



LEGEND

- PC-9 — SAMPLING POINT IN CREEK OR RIVER
- LR-9 D — OBSERVATION POINT
- PC-16 D — SAMPLING POINT SHOWING DRAINAGE BASIN AND SAMPLING POINT CODE

D — OPEN DRAIN OR DITCH
F — FIELD TILE
W — STORM SEWER
S — SANITARY WASTES
LR — LITTLE RIVER
PC — PIKE CREEK
MD — MANNING DRAIN & MISC.
TC — TURKEY CREEK
RC — RIVER CANARD

# ENVIRONMENT ONTARIO

## TOWNSHIP OF SANDWICH SOUTH
## WATER POLLUTION SURVEY
## APRIL, MAY, AUGUST, 1972

SCALE: 2000 0 2000 4000 FEET

| | |
|---|---|
| DRAWN BY: L.L.B. | DATE: SEPTEMBER, 1972 |
| CHECKED BY: W.B. | DRAWING Nº: 72-67-DE |